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Water Supply Outlook For Washington



SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

Cooperating with

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

AS OF
JUNE 1, 1980

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO: THE SNOWTEL PROJECT CENTRAL COMPUTER FACILITIES IN PORTLAND, OREGON. THE TERMINAL, PRINTER, COMPUTER AND TAPE DRIVES HAVE NOT COMPLETELY REPLACED THE SNOW SAMPLING TUBES SEEN IN THE FOREGROUND.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 510, 511 N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	Room 129, 2221 East Northern Lights Blvd., Anchorage, Alaska 99504
Arizona	Room 3008, Federal Building, 230 N. First Ave., Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno, Nevada 89505
Oregon	1220 S. W. Third Ave., Portland, Oregon 97204
Utah	4420 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U. S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Snow Surveys Branch, California Department of Water Resources, P.O. Box 388, Sacramento, California 95802 --- for British Columbia by the Ministry of the Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia V8V 1X5 --- for Yukon Territory by the Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory Y1A 3V1 --- and for Alberta, Saskatchewan, and N.W.T. by the Water Survey of Canada, Inland Waters Branch, 110-12 Avenue S.W., Calgary, Alberta T3C 1A6.



WATER SUPPLY OUTLOOK FOR WASHINGTON

and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

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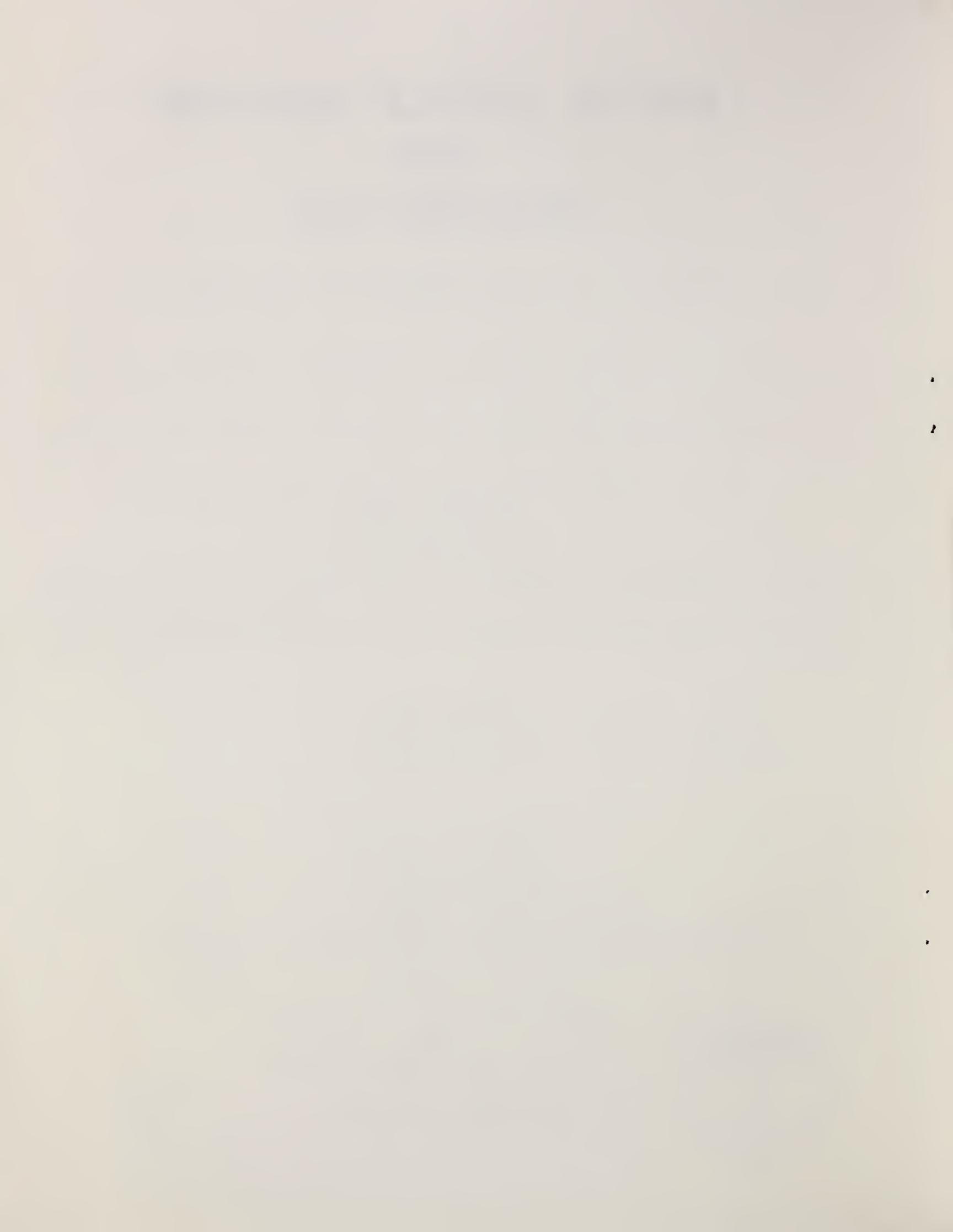
In Cooperation with

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Report prepared by

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SOIL CONSERVATION SERVICE
360 U.S. COURTHOUSE
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WATER SUPPLY OUTLOOK

State of Washington

June 1, 1980

We can't blame Mount St. Helens for melting our snow because it was mostly gone before she blew. Due to the warm weather in April and the early part of May, the bulk of the snow was gone by May 15, leaving very few courses to be measured as of June 1. The few courses that did have snow as of June 1, showed an improvement, percentagewise, over the May 15 measurements. This was due to the cooler weather during the latter part of May. Percentages of normal for May 15 ranged from 11 to 40 percent, while on June 1, they ranged from 40 to 76 percent. However, this early snow melt was not all lost. Reservoirs in the state are in excellent shape. Most reservoirs are filled to near capacity and with normal weather conditions, water should be ample. Rainfall over the state during May was an average of 61 percent above normal. Only two drainage divisions, the Northwest and Southwest Slopes of the Cascades, were below normal. The divisions ranged from 45 percent below average to 137 percent above. Streamflows, percentagewise, were considerably less than last month, but most of them are still within normal or above range; the lowest being the Green River with 43 percent below normal and the highest, the Columbia at Birchbank with 43 percent above normal.

THIS IS THE LAST WATER SUPPLY OUTLOOK REPORT FOR 1980. IF YOU WISH TO RECEIVE THESE REPORTS NEXT YEAR, PLEASE RETURN THE BACK COVER OF THE MAY 1 REPORT IF YOU HAVE NOT ALREADY DONE SO.

SNOW COVER

On May 15, in the Pend Oreille Drainage, five of the six snow courses scheduled had snow averaging 34 percent of normal. By June 1, five courses normally have snow. Three of them had an average of 76 percent of their normal snow and the other two were bare. The Kettle River Drainage had no snow at all as of May 15. Only one course was measured in the Spokane Drainage and the snow there was 8 percent of normal on May 15 and gone by June 1. In the Okanogan Drainage, of 19 courses that were measured on May 15, only 4 had any snow and they averaged 36 percent of normal. Normally, seven snow courses scheduled to be measured on June 1 have snow. This year, only two of them had any snow left and they averaged 52 percent of normal. In the Chelan Lake Basin, aerial markers were looked at. There were no normals to compare, but the estimated snow water equivalent appears to be about the same as last year at this time. Only two courses were measured in the Wenatchee Drainage. They averaged 29 percent of normal on May 15, and by June 1, the snow at the lower elevation was gone and at the higher elevation, it was 40 percent of normal. Only two courses that were measured in the Yakima Drainage had snow as of May 15, and they averaged 25 percent of normal and both were bare by June 1. Last month, we mentioned a point of interest about the Plains of Abraham Snow Course on the northeast slope of Mount St. Helens. This month, we are assuming that the snow course is gone.

RESERVOIRS

Reservoirs appear to be in excellent shape. The early snow melt and above average amounts of rain have filled most reservoirs to near capacity and, in most cases, considerably above normal. It is reported that the Yakima Reservoir situation is ample at this time and with normal weather conditions, there should be no shortages. The two small reservoirs in the Okanogan Irrigation District are filled to capacity. F. D. Roosevelt Lake is nearly full and has 197 percent of normal water in storage. Banks Lake is filled to 95 percent of capacity and has 167 percent of normal water. The three power reservoirs in the Puget Sound area are in good shape. Ross Reservoir is above normal for this time of year and it is expected that all three reservoirs will be filled to near capacity by July 1. Lake Chelan is being controlled to keep the water from spilling, but is expected to fill by the middle of June.

PRECIPITATION

Rainfall over most of the state and tributary basins was much above normal during the month of May, ranging from 38 percent above in the Columbia above Castlegar Division to 137 percent above in the Central Washington Division. Only on the Northwestern and Southwestern Slopes of the Cascades was rainfall below normal, and it was 84 and 55 percent of normal, respectively. When combined into the Spring period of April and May, the above normal range was from 12 percent above in the Columbia at Castlegar to 82 percent above in Northeastern Washington with the Northwest Slopes of the Cascades at 78 percent and the Southwest Slopes at 76 percent of normal.

STREAMFLOW

Streamflows were considerably lower, percentagewise, than reported last month. Probably, because most of the snow melted and ran off during the warm temperatures in April and the cooler temperatures in May kept what little snow was left from melting so fast. Above normal flows were reported at all stations on the Columbia - from 16 to 43 percent above average; on the Kettle, 50 percent above; Similkameen, 41 percent above; Okanogan, 32 percent above; Chelan, 24 percent above; Wenatchee, 15 percent above; and Klickitat, 1 percent above. The rest of the flows were subnormal, ranging from 43 percent below average on the Green River to just 1 percent below on the Yakima. The Cowlitz at Castle Rock was 67 percent of normal, which accounts for only the first 17 days of the month. The gage was destroyed on May 18 by flood waters caused by the eruption of Mount St. Helens. Therefore, there is no record after May 18, and will be none until the gage is replaced.

RESERVOIR STORAGE - 1000 Acre Feet

BASIN OR STREAM	RESERVOIR	USABLE CAPACITY	Measured June 1			
			1980	1979	1078	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	225.1	242.5	236.2	190.0	225.0
Columbia	Franklin D. Roosevelt Lake	5232.0	5058.7	3433.6	2211.4	2565.6
Columbia	Banks Lake	714.9	680.2	456.6	527.9	406.2
Okanogan	Conconully Reservoir	13.0	13.0	10.5	9.6	9.1
Okanogan	Conconully (Salmon) Lake	10.5	10.5	8.1	10.5	9.4
Chelan	Lake Chelan	676.1	570.6	437.3	470.3	450.6
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	147.1	157.6	158.9	139.6
Kachess	Kachess Lake	239.0	163.0	236.9	242.2	217.1
Cle Elum	Lake Cle Elum	436.9	436.2	338.0	441.2	367.9
Bumping	Bumping Lake	33.7	33.4	35.1	34.7	25.4
Tieton	Rimrock Lake	198.0	198.8	171.0	199.0	160.2
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1404.1	1129.5	1107.7	1068.0	1033.9
Skagit	Diablo Reservoir	90.6	85.1	87.2	84.9	86.1
Skagit	Gorge Reservoir	9.8	7.2	8.1	8.2	8.3

1/ Based on Active Storage

* 15-yr. Average 1963-1977

PRECIPITATION 1/

Division Average Observations and Departures

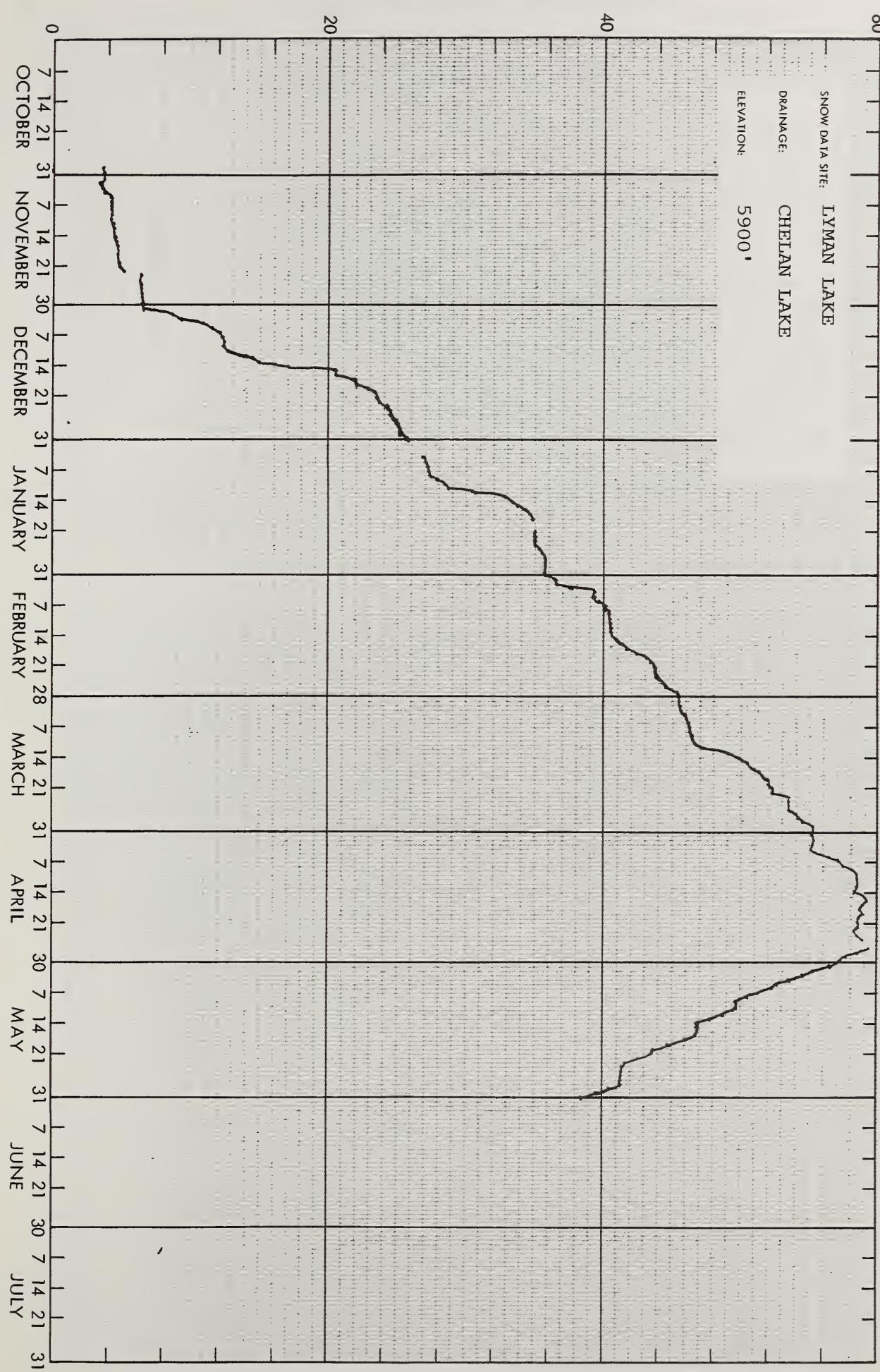
Drainage Divisions	FALL		WINTER		SPRING	
	Sept-Oct Observed	1979 2/ Departure	Nov.-1979--Mar.-1980 Observed	1980 2/ Departure	Apr-May Observed	1980 2/ Departure
Columbia in Canada	4.44	-0.58	13.78	-1.73	3.90	+0.43
Pend Oreille - Spokane	3.23	-0.81	13.28	-4.27	5.91	+2.06
Northeastern Washington	2.53	+0.05	9.70	+0.30	5.71	+2.50
Southeastern Washington	2.53	+0.02	10.79	+0.36	3.30	+2.65
Central Washington	1.55	+0.58	6.84	+1.56	2.38	+1.03
North Central Washington	2.22	+0.63	6.05	-0.49	3.07	+1.30
Northwest Slope Cascades	10.68	-2.53	51.07	-4.32	8.02	-2.38
Southwest Slope Cascades	9.66	+0.98	35.13	-6.51	5.90	-1.40

Northeastern Washington	- Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.
Southeastern Washington	- Touchet, Tucannon and Palouse Drainages.
Central Washington	- Yakima, Wenatchee and Chelan Drainages.
North Central Washington	- Methow and Okanogan Drainages.
Northwest Slope Cascades	- Puget Sound Drainages.
Southwest Slope Cascades	- Lower Columbia Drainages.

1/ - Preliminary analysis by National Weather Service from data furnished by Meteorlogical Services of Canada and the National Weather Service.

2/ - Departure from 15-year (1958-72) drainage division average.

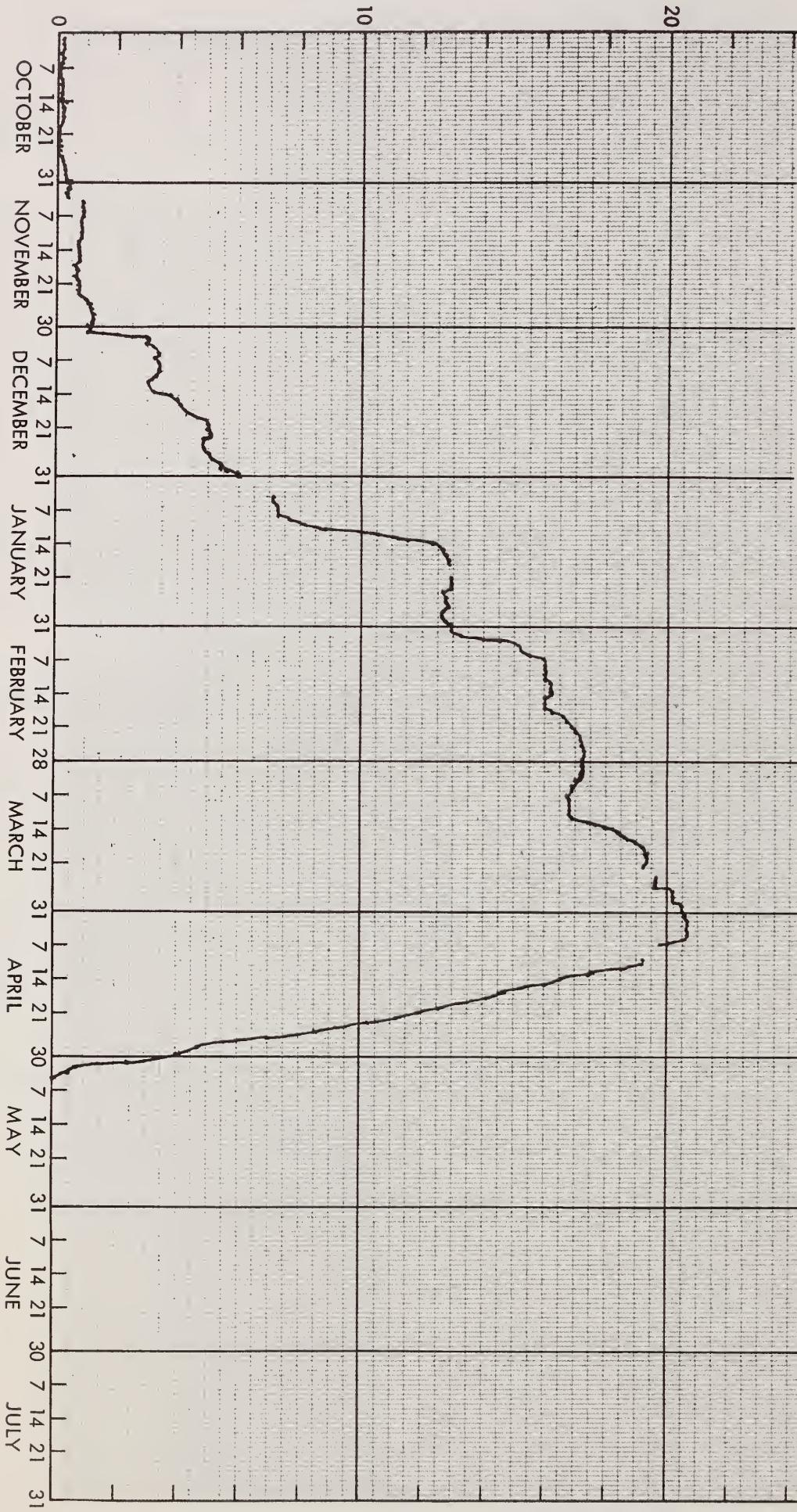
INCHES OF WATER IN SNOWPACK



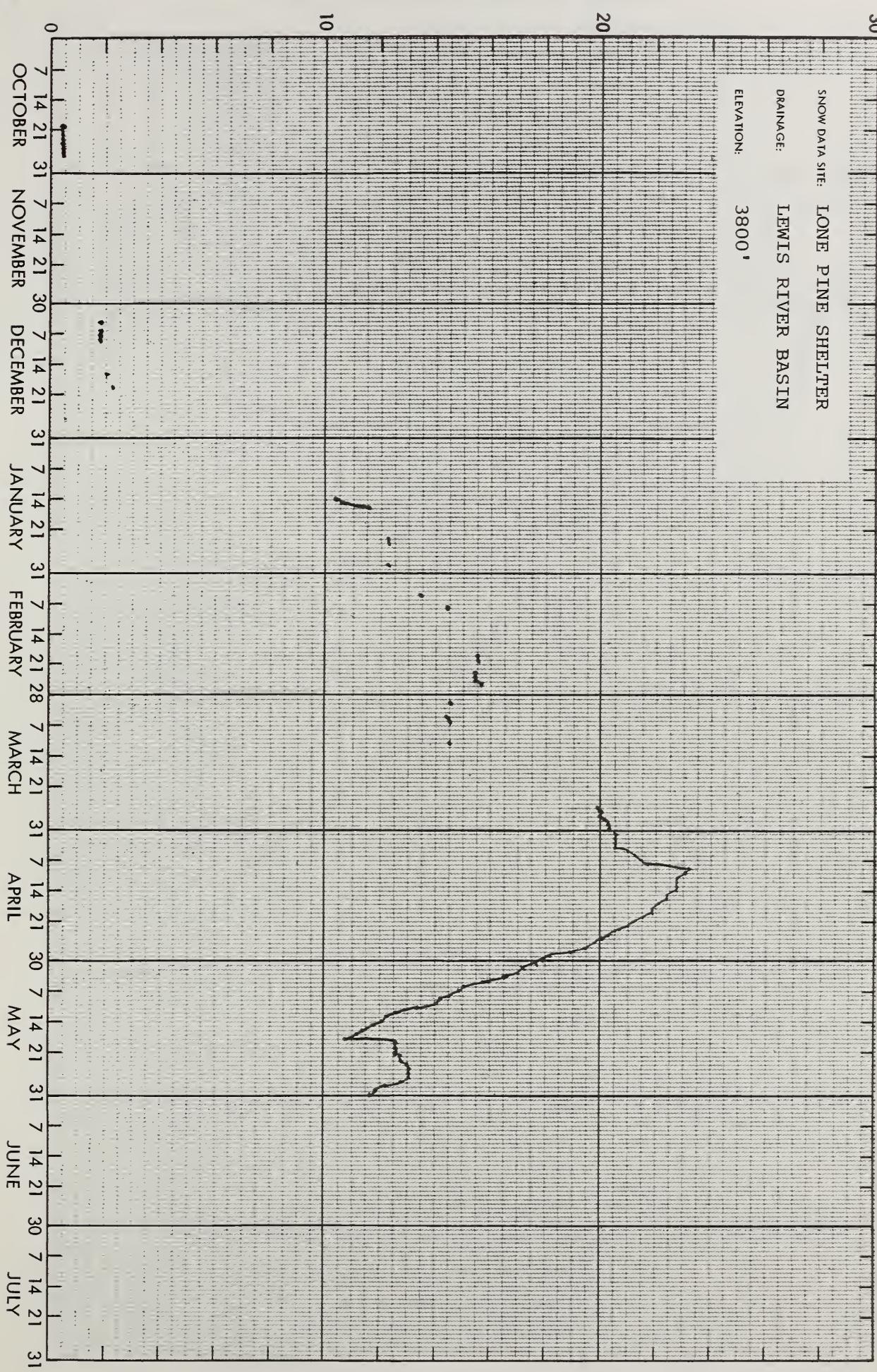
INCHES OF WATER IN SNOWPACK

30
SNOW DATA SITE: BIG BOULDER CREEK

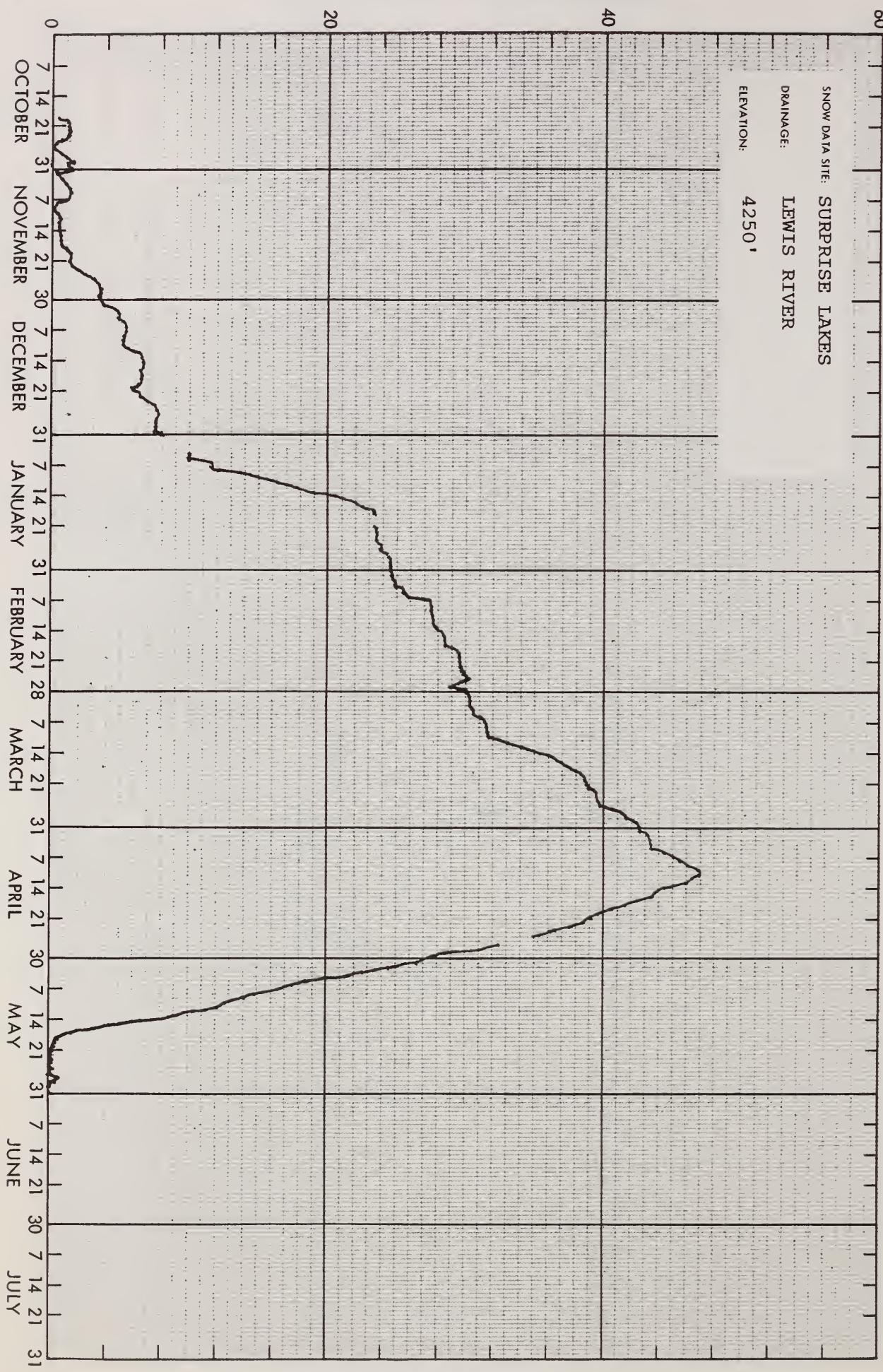
DRAINAGE: YAKIMA RIVER
ELEVATION: 3200'

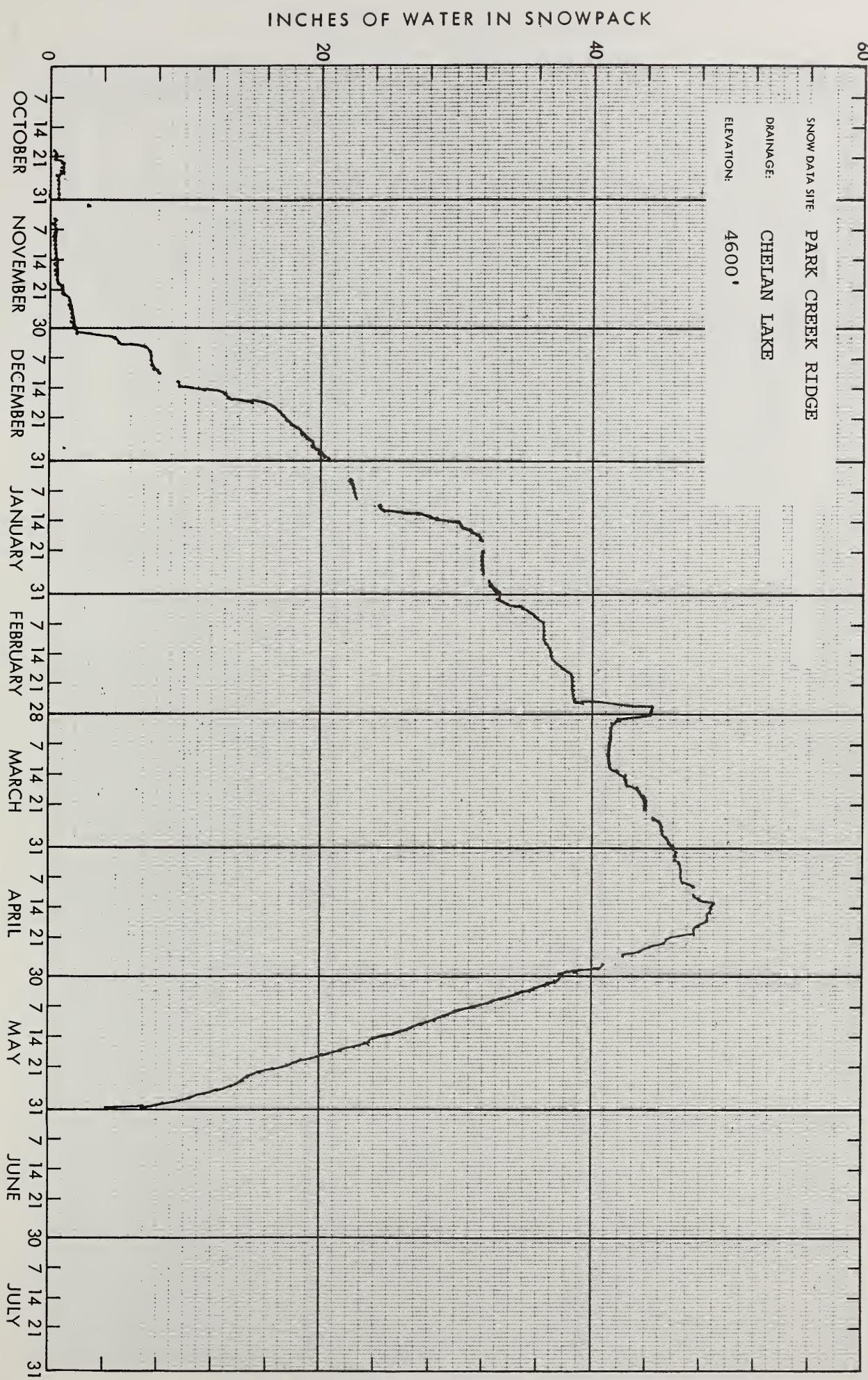


INCHES OF WATER IN SNOWPACK

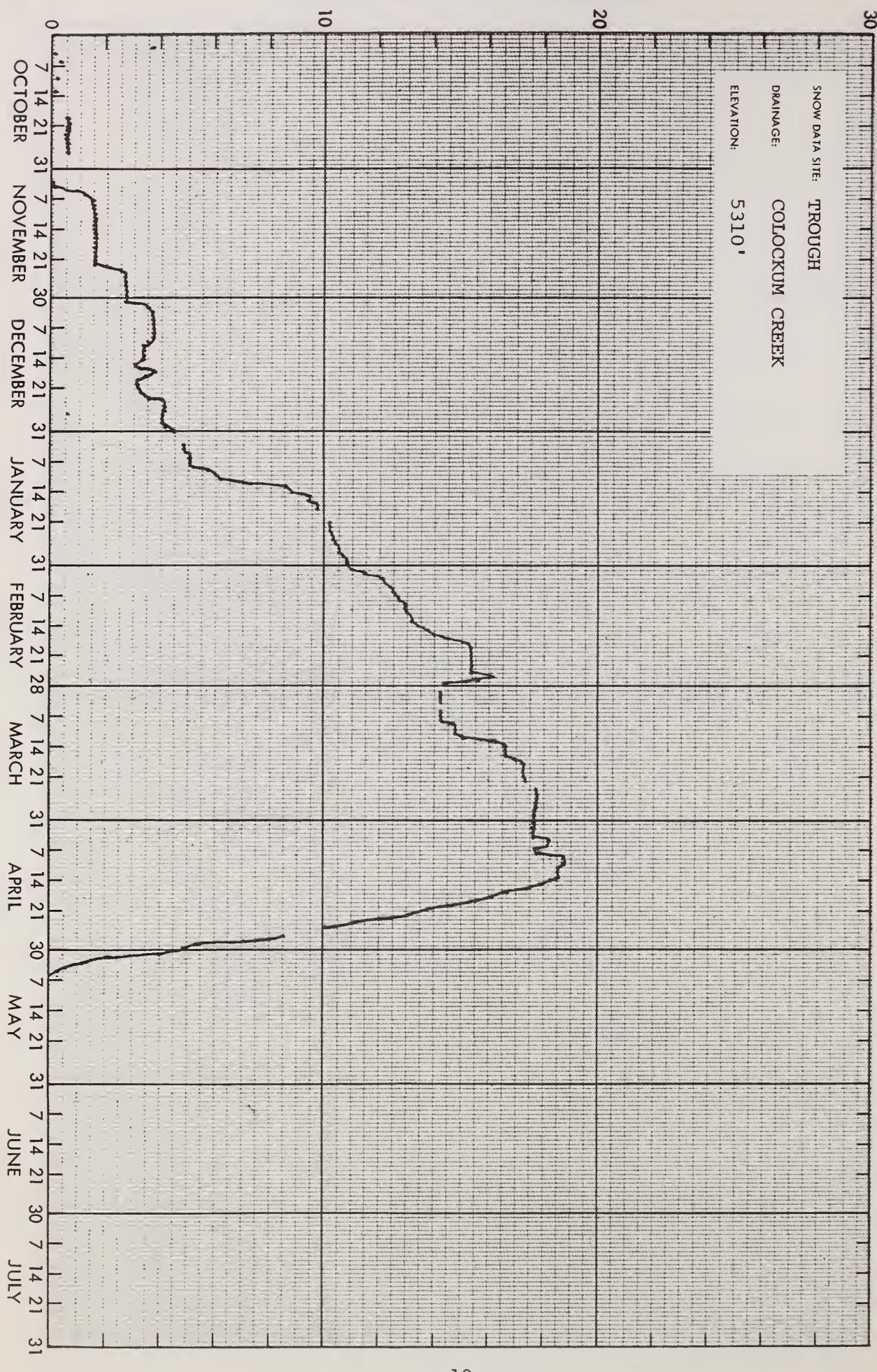


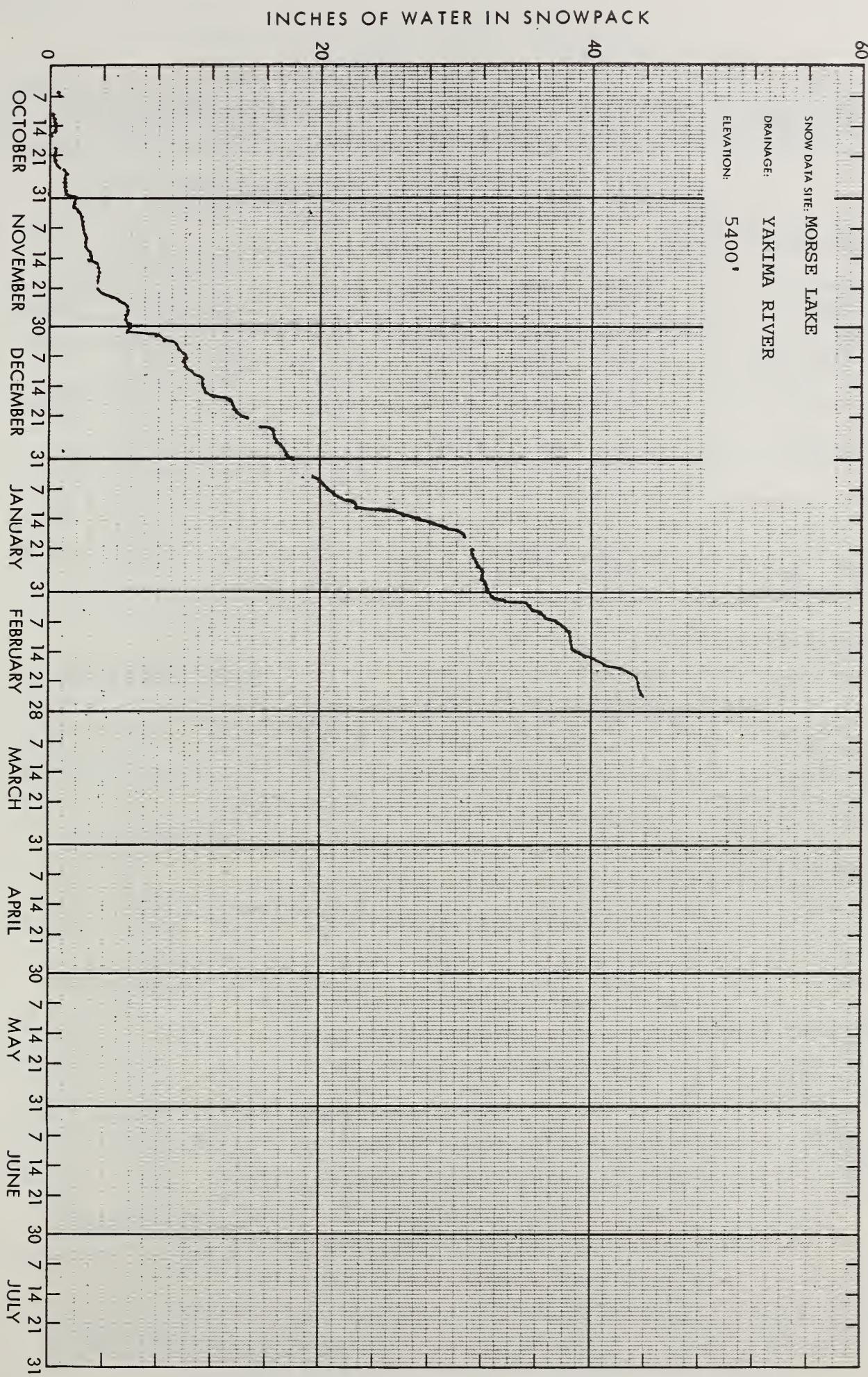
INCHES OF WATER IN SNOWPACK





INCHES OF WATER IN SNOWPACK





SNOW DATA TO JUNE 1, 1980 - APPENDIX 1

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (inches)	Water Content (inches)	Water Content (inches)	Last Year
NAME	Number	Elevation					Average #

U P P E R C O L U M B I A D R A I N A G E

PEND OREILLE RIVER

Baree Creek	15B11	5500	5/15	23	13.0	33.1	41.5
Baree Midway	15B16	4600	5/15	6	2.9	21.1	25.0
Baree Trail	15B15	3800	5/15	0	0.0	0.0	0.0
Heart Lake Trail	14C10	4800	5/15	Not Measured	13.5	10.2	
			5/29	0	0.0	0.0	-
Hoodoo Basin	15C10	6000	5/15	Est.	30.0	40.0	50.5
			5/29	44	24.5	28.8	39.0
Hoodoo Creek	15C01	5900	5/15	Est.	28.0	40.0	46.2
			5/29	43	23.2	28.9	36.5
Lookout	15B02	5250	5/15	5.2	2.4	20.0	30.9
			5/30	0	0.0	3.7	15.0
Nelson	19-Can	3050	5/15	0	0.0	0.7	1.1*
Schweitzer Bowl	16A06	4500	5/30	0	0.0	0.0	-
Schweitzer Ridge	16A05	6100	5/30	11	5.4	16.7	-

KETTLE RIVER

Big White Mtn.	154-Can	5500	6/1	0	0.0	1.4	10.4*
Carmi	126-Can	4100	5/15	0	0.0	-	0.0*
Farron # 1	17-Can	4000	5/15	Not Measured	-	3.3*	
Grayscale Lake	5-Can	5950	5/15	Not Measured	-	13.9*	
Monashee Pass	48A-Can	4500	5/15	0	0.0	6.2	8.9*
Trapping Creek Lower	166-Can	3050	5/15	Not Measured	-	0.0*	
Trapping Creek Upper	165-Can	4450	5/15	0	0.0	-	0.4*

SPOKANE RIVER

Granite Peak	15B13A	6000	6/1	Not Measured	20.6	31.5
Lookout	15B02	5250	5/15	5.2	2.4	20.0
			5/30	0	0.0	3.7
Lost Lake	15B14A	6000	6/1	Not Measured	28.2	46.4

OKANOGAN RIVER

Aberdeen Lake	6A-Can	4300	5/15	0	0.0	-	0.1*
Blackwall Mountain	100-Can	6250	5/15	47	18.9	19.6	35.6*
			5/30	32	14.2	8.5	27.6*
Brenda Mine	193-Can	4800	5/14	0	0.0	0.0	2.3*
Brookmere	27-Can	3200	5/14	0	0.0	0.0	2.1*
Enderby	130-Can	6250	5/13	54	26.1	28.0	44.2*
			5/30	34	17.5	23.4	38.0*

Average based on 1963-1977 period

* Average for years of record

SNOW DATA TO JUNE 1, 1980 - APPENDIX 2

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD		
NAME	Number	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	Last Year	Average #

OKANOGAN RIVER (Cont.)

Hamilton Hill	107-Can	4900	5/14	0	0.0	0.0	6.4*
Isintok Lake	152-Can	5510	5/15	0	0.0	0.0	4.9*
Lost Horse Mountain	105-Can	6300	6/1	Late Report	-	4.1*	
McCulloch	4-Can	4200	5/15	0	0.0	0.0	0.6*
Missezula Mountain	106-Can	5100	5/13	0	0.0	0.0	2.7*
Mission Creek	5A-Can	6000	5/15	9.1	3.4	15.8	19.4*
			6/1	0	0.0	6.9	12.4
Mónashee Pass	48A-Can	4500	5/15	0	0.0	6.2	8.9*
Mount Kobau	156-Can	5950	5/13	3.5	1.5	2.0	10.5*
			5/30	0	0.0	0.0	4.4*
New Penticton Res. #2	183-Can	5225	5/15	0.0	0.0	0.9	5.8*
Nickel Plate Mtn.	47-Can	6200	5/15	0	0.0	-	6.3*
Silver Star Mountain	99-Can	6050	5/15	13	5.6	17.0	26.3*
			6/2	0	0.0	5.5	16.9*
Summerland Reservoir	3A-Can	4200	5/15	0	0.0	0.0	2.3*
Trout Creek	3-Can	4700	5/15	0	0.0	0.0	1.8*
Vaseux Creek	233-Can	4600	5/15	0	0.0	0.0	0.3*
White Rocks Mountain	70-Can	6000	5/16	0	0.0	-	19.0*
			6/1	Not Measured	1.8	13.7*	

CHELAN LAKE BASIN

Cloudy Pass +	20A22a	6500	5/15	Marker Missing	36.7	-
Little Meadows +	20A24a	5275	5/15	58	24.6	24.8
Lyman Lake +	20A23A	5900	5/15	90	38.2	32.8
Park Creek Ridge +	20A12A	4600	5/15	31	13.2	14.2

WENATCHEE RIVER

Stevens Pass	21B01	4070	5/15	52	25.2	31.2	48.8
			5/31	32	16.5	13.5	40.6
Stevens Pass Sand Shed	21B45	3700	5/15	3.4	1.5	13.3	25.4
			5/31	0	0.0	0.0	18.7

YAKIMA RIVER

Bumping Lake	21C08	3450	5/14	0	0.0	-	3.6
Bumping Lake New	21C36	3400	5/14	0	0.0	-	11.8
Stampede Pass	21B10	3860	5/15	12	4.7	17.0	41.7
			6/1	0	0.0	3.6	26.9
Tunnel Avenue	21B08	2450	5/12	0	0.0	-	14.4
White Pass (E. Side)	21C28	4500	5/13	25	11.5	-	29.1
			6/1	Not Measured	-	-	17.4

LOWER COLUMBIA DRAINAGECOWLITZ RIVER

White Pass (E. Side)	21C28	4500	5/13	25	11.5	-	29.1
			6/1	Not Measured	-	-	17.4

Average based on 1963-77 period

* Average for years of record

+ Snow water equivalent estimated from aerial stadia observation

SNOW DATA TO JUNE 1, 1980 - APPENDIX 3

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
NAME	Number	Elevation	Date of Survey	Snow Depth (inches)	Water Content (inches)	Water Content (inches)	Last Year

P U G E T S O U N D D R A I N A G E

Stampede Pass	21B10	3860	5/19	12	4.7	17.0	41.7
			6/1	0	0.0	3.6	26.9

SKYKOMISH RIVER

Stevens Pass	21B01	4070	5/15	52	25.2	31.2	48.8
			5/31	32	16.5	13.5	40.6
Stevens Pass Sand Shed	21B45	3700	5/15	3.4	1.5	13.3	25.4
			5/31	0	0.0	0.0	18.7

BAKER RIVER

Dock Butte	21A11A	3800		Late Report	33.0	57.2
Easy Pass	21A07A	5200		Late Report	36.0	75.8
Jasper Pass	21A06A	5400		Late Report	50.0	85.6
Marten Lake	21A09A	3600		Late Report	51.0	68.9
Mount Blum +	21A18a	5800		Late Report	46.0	72.1
Panorama New	21A26	4300	5/15	68 34.3	45.9	-
			6/1	Not Measured	-	74.2
Rocky Creek	21A12A	2100		Late Report	0.0	2.2
Schreibers Meadow	21A10A	3400		Late Report	22.0	46.3
Watson Lakes	21A08A	4500		Late Report	37.0	62.6

NOOKSACK RIVER

Panorama New	21A26	4300	5/15	68 34.3	45.9	-
			6/1	Not Measured	-	74.2

CORRECTIONS AND ADDITIONS - 1980 SNOW REPORTS

February 1

OKANOGAN & METHOW RIVERS

Salmon Meadows	19A02	4500	1/28	<u>33</u>	<u>7.5</u>	<u>1.6</u>	7.7
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Average based on 1963-77 period

+ Snow water equivalent estimated from aerial stadia observation

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Ministry of the Environment, Water
Investigations Branch, Victoria, British Columbia

States:

Washington State Department of Ecology
Washington State Department of Natural Resources

Federal:

Department of the Army
Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
NOAA, National Weather Service
U. S. Department of the Interior
Bonneville Power Administration
Bureau of Reclamation
Geological Survey
National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

City of Tacoma
City of Seattle

*Other organizations and individuals furnish valuable information for
snow survey reports. Their cooperation is gratefully acknowledged.*



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PRODUCTION SECTION
CURRENT SERIAL RECORDS

**FEDERAL - STATE - PRIVATE
COOPERATIVE SNOW SURVEYS**

Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*